Goal: Lone-Divider, Introduce Sealed Bids

1. Abel, Barbie, and Chris are splitting a the cake worth $36. Abel is the Divider who determines the three pieces. Barbie and Chris value the pieces according to the following table:

	piece 1	piece 2	piece 3
Abel	$12	$12	$12
Barbie	$18	$12	$6
Chris	$11	$18	$7

   (a) How much value is a fair share of the cake? $36/3 = $12

   (b) Which pieces represent a fair share for Barbie? pieces 1 and 2

   (c) Which pieces represent a fair share for Chris ? piece 2

   (d) Is it possible to distribute the pieces of cake to the three people so that everyone gets a piece that is a fair share for them? If so, explain how to do so; if not, explain what happens next. Abel gets piece 3, Barbie piece 1, Chris piece 2

2. Method of Sealed Bids (pg 103 for full description)

   1) Each player submits a sealed bid on each item.
   2) Calculate textbfTotal value and **Tfair share** for each player.
   3) Award each item to highest bidder.
   4) For each player, determine the difference between the value received and fair share. (owed to holding pile or received from holding pile)

   5a) Calculate the surplus and divide it equally.

   5b) Determine the final allocation.

3. Example 1. Anand and Bert are dividing the property below. Their value of each item is in the table below.

	items	Anand	Bert
1)	couch coffee maker framed artwork	\$300 (high bid) \$50 \$50	\$200 \$100 \$60
2)	Total Value Fair Share	300+50+50=400 400/2 = \$200	200+100+60=360 360/2 = \$180
3)	Award & Sum	couch for \$300	coffee maker + art = 100 + 60 = \$160
4)	(Award)-(Fair Share) mark owed or received	300 − 200 = \$100 owed to holding	160 − 180 = \$−20 received from holding
5a)	total surplus per person	100 − 20 = 80 80/2 = \$40	80 \$40
5b)	Final Allocation total check:	couch 300 pays \$60 −60 ✓ 200 < 240	coffee maker 100 art 60 \$60 cash 60 ✓ 180 < 220

holding: +100 from A, −20 to B, 80

Yep! It's fair!

4. Example 2. What happens if Anand takes a different strategy and bids high in order to ensure receiving the three items?

	items	Anand	Bert
1)	couch coffee maker framed artwork	\$400 \$200 \$100	\$200 \$100 \$60 (no change)
2)	Total Value Fair Share	400+200+100=700 700/2 = \$350	\$180
3)	Award & Sum	couch, CM, art worth \$700	no items. \$0
4)	(Award)-(Fair Share) mark owed or received	\$700 − \$350 = 350 owed to holding	0 − 180 = −180 received from holding
5a)	total surplus per person	170 170/2 = +85	+85
5b)	Final Allocation	couch, CM, art and pays \$265	\$265 cash

holding: +350, −180, +170 → 85, 85

350 − 85

fair? \$700 − \$265 = \$435 > \$350. Yes!

fair? Yes. It's greater than \$180